

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/05147

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : A61K 31/00, 38/00, 39/395, 39/44; A01N 37/18; C07K 16/00  
 US CL : 424/130.1, 141.1, 142.1; 514/1,2; 530/387.1

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/130.1, 141.1, 142.1; 514/1,2; 530/387.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 WEST (USPT, PGPUBS, US OCR, JPO, EPO, DERWENT); NCBI (PubMed); STN (Bioscience)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/0012783 A1 (KINDSVOGEL) 16 January 2003 (16.01.2003), entire document.	1-15, 21, 23
A	MADRY, C. ET AL. The Characterization of Murine BCMA Gene Defines it as a New Member of the Tumor Necrosis Factor Receptor Superfamily. International Immunology. November 1998, Vol. 10, No. 11, pages 1693-1702, entire document.	1-15, 21, 23
A	GROSS, J.A. ET AL. TACI and BCMA are receptors for a TNF homologue implicated in B-cell autoimmune disease. Nature. 27 April 2000, Vol. 404, No. 6781, pages 995-999, entire document.	1-15, 21, 23
A	XU, S. ET AL. B-Cell Maturation Protein, Which Binds the Tumor Necrosis Factor Family Members BAFF and APRIL, Is Dispensable for Humoral Immune Responses. Molecular and Cellular Biology. June 2001, Vol. 21, No. 12, pages 4067-4074, entire document.	1-15, 21, 23
A	HATZOGLOU, A. ET AL. Natural antisense RNA inhibits the expression of BCMA, a tumour necrosis factor receptor homologue. BMC Molecular Biology. 18 April 2002, Vol. 3, No. 1, pages 1-7, entire document.	1-15, 21, 23

☒ Further documents are listed in the continuation of Box C.

See patent family annex.

**\* Special categories of cited documents:**

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;"

document member of the same patent family

Date of the actual completion of the international search

07 September 2004 (07.09.2004)

Date of mailing of the international search report

05 NOV 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Christopher J Nichols, Ph.D.

Telephone No. (571) 272-1600

*J. Roberto for*

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## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-15, 21 and 23

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

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**BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group 1, claim(s) 1-15, 21, and 23 (in part), drawn to a method of treating a neurodegenerative immunological disorder, comprising administering to a mammal a therapeutically effective amount of BCMA, an antibody against a BCMA ligand, or an antibody against BCMA, thereby treating the disorder.

Group 2, claim(s) 16, drawn to a method for identifying a compound effective for treatment of a neurodegenerative immunological disorder.

Group 3, claim(s) 17-20, drawn to a method of treating a subject in need for treatment of multiple sclerosis, the method comprising administering soluble BCMA to a subject.

Group 4, claim(s) 22 and 23 (in part) drawn to use of a nucleic acid encoding BCMA in preparation of a pharmaceutical for treatment of a neurodegenerative immunological disorder.

According to PCT Rule 13.2, unity of invention exists only when there is a shared same or corresponding special technical feature among the claimed inventions. All the groupings are directed to BCMA but each group has a different special technical feature not shared by the remaining groups.

Group 1 has the special technical feature of an anti-BCMA antibody not shared by any of the remaining groups.

Group 2 has the special technical feature of identifying a compound (structure unknown) not shared by any of the remaining groups.

Group 3 has the special technical feature of therapeutic soluble BCMA molecule not shared by any of the remaining groups.

Group 4 has the special technical feature of therapeutic BCMA nucleic acid not shared by any of the remaining groups.